

The Prevalence of Rabies in the United States and the World*

THURMAN B. RICE, M.D.

Indiana University School of Medicine, Indianapolis, Ind.

and

NORMAN BEATTY, M.D.

Formerly Director of Indiana State Board of Health, Pasteur Laboratory

RABIES deserves to be considered one of the most important of health problems. The number of deaths is not appalling but the suffering and fear caused by it are so great that they make this the most dreaded of all diseases. The co-authors of this paper, having both served at different times as director of the Indiana Pasteur Institute and, having seen the great increase in the disease in that state, determined to find to what extent this condition prevailed in other states and in other parts of the world. Data on the subject are fragmentary, hard to get, and not at all reliable.

Questionnaires were sent to the health officer of every state in the Union, to all the provinces of Canada, and to practically all foreign countries, asking for data on rabies in man and in animals. By this and other means information was received from every state though not always was the information complete. Medical literature was exhaustively searched for references to geographical distribution of the disease and for evidences of its increase or decrease. About thirty foreign countries answered our letter—a most interesting correspondence. A voluminous letter from Japan is still untranslated.

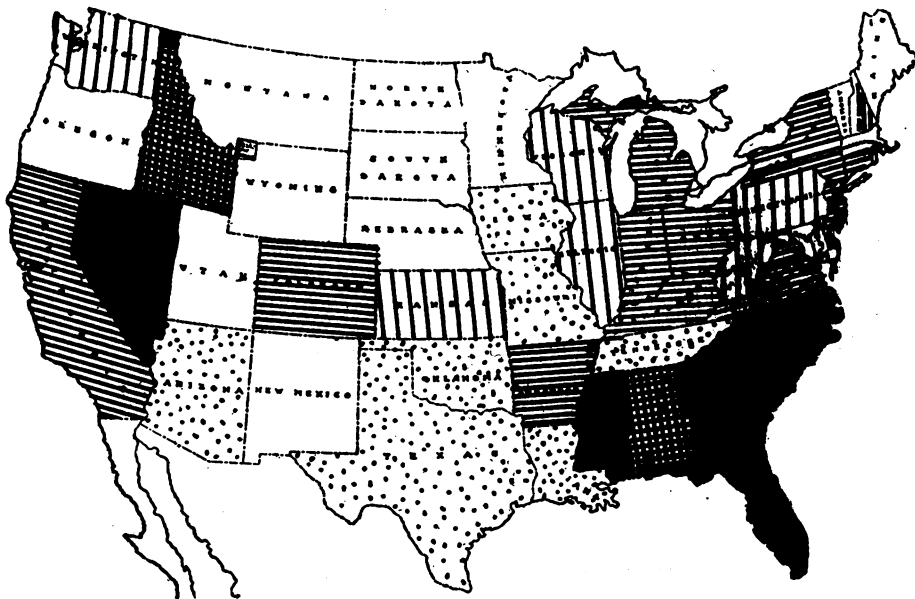
From this large mass of evidence we have endeavored to sort out the salient facts, though we are keenly aware of the fact that much of the data is conflicting, as for example the total number of human deaths as reported to us by states, and as reported by the Bureau of the Census for the U. S. Registration Area.

In order to show present conditions in as graphic a manner as possible we have attempted to shade a map of the United States to represent the prevalence of rabies. This map was made as nearly as possible on the same scale as another published by Sellers¹ representing conditions in 1921, also presented here. Sellers's shading is made on basis

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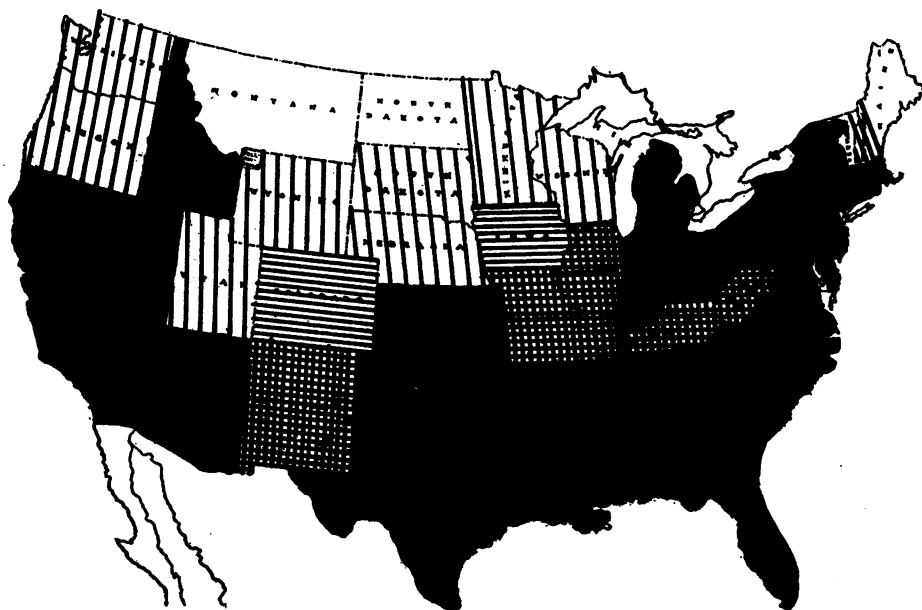
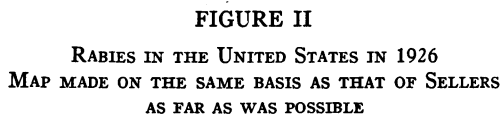
FIGURE 1

MAPS SHOWING PREVALENCE OF RABIES IN UNITED STATES
IN 1921 ACCORDING TO SELLERS



of the number of cases in animals per 100,000 human population—not a very satisfactory basis but the best that could be devised under the circumstances. Frequently in the case of our investigation such a source of information was evidently unreliable, and in such event any other available source of information was used. If, for example, the number of human deaths for a given state was high that state was made black even though the number of cases in animals reported was low (incomplete returns). The state of New York was made black on basis of various references to the condition in medical literature.²⁴ Texas was made black on the strength of newspaper reports and records of companies selling rabies vaccine. Such sources are not highly satisfactory, but we believe that with this explanation their use is justifiable.

It is interesting to note that Kerr and Stimson²⁵ found little of this disease in the western states in 1908. They report that California, Idaho, Nevada, and New Mexico were free of the disease, while in 1926 these states were heavily infected. Indeed, California has had more deaths (human) in recent years than any other state of which we have record (68 deaths since 1909). California shows two peaks in her epidemic, 1912-13 with 9 and 8 human deaths respectively, and 1923 with 11.



KEY

Dotted	no data						
White	no rabies						
Vertical lines	less than one	positive	head per	100,000	human	population	
Horizontal lines	one to five	"	"	"	"	"	"
Crossed lines	five to ten	"	"	"	"	"	"
Solid Black	ten or more	"	"	"	"	"	"

The following states reported that the disease is now increasing or has done so in very recent years: Arkansas, California, Georgia, Illinois, Indiana, Iowa, Kansas, Kentucky, Louisiana, Massachusetts, Michigan, New Jersey, New Mexico, New York, North Carolina, Ohio, Oklahoma, Pennsylvania, South Carolina, Tennessee, Virginia, West Virginia, and the District of Columbia.

If we pin our reliance upon figures it would seem that there has been a very great increase in certain states (See 4 charts).

Considering the seriousness of this disease both in man and animals it is quite surprising that there are so few reliable records. The loss of stock and the expense of giving treatment to man and beast must cause the expense of this strictly preventable disease to mount well into the millions of dollars each year. The loss of human life is by no means inconsiderable. Apparently the most reliable records are those of human deaths reported to the Bureau of the Census.

Rabies in other countries than our own may be of some interest. The data presented is from questionnaires and from the literature.

Canada—Since the map of the United States shows very little rabies in the northern states we might expect still less in Canada. Our data bear out this expectation, though we know there is some of it in the Arctic regions.

Alberta—No record of any case in ten years.

British Columbia—Only one case in any animal known, and this was in a dog brought in by a tourist. No human deaths.

Manitoba—Some rabies in animals. No human deaths.

New Brunswick—None since 1918. No records previous to that date.

Nova Scotia—None in animals or man.

Ontario—After several years' freedom from the disease it was introduced from Quebec and quickly spread. Forty-one positive brains were examined in 1926. No human deaths.

Prince Edward Island—Questionnaire not answered.

Quebec—Rabies spreading rapidly from two foci. No human deaths.

Saskatchewan—No rabies 1926.

Alaska—Not common but has been observed particularly in wolves and foxes.

Arctic Regions—Nansen mentions the occurrence of rabies in "Farthest North," and it has been reported from Greenland.

Mexico—Rabies is very common. There are many Pasteur Institutes and thousands of treatments are given annually. The number of human deaths is rather large but exact information is not available.

Cuba—Has been epidemic to a serious degree in recent years.

South America

Ecuador—Not common.

Venezuela—Rare in animals and extremely so in human beings.

Argentina—Fairly prevalent.

Brazil—It has been epidemic at different times especially in the north.

El Salvadore—Present.

From incomplete returns we may reasonably conclude that the disease is present in moderate amount in the greater portion of the continent.

Europe

Belgium—There has been very little rabies except during the Great War when antirabic precautions were relaxed. During times of peace elaborate precautions are taken to prevent its introduction. These methods have been highly effective.

England—By strict muzzling ordinances, England was able entirely to rid the country of the disease in 1902. After that time there was none until 1918 when the disease was re-introduced. It spread rapidly but has again come under control and there has been none since 1922.

France—The home land of Pasteur has long been seriously plagued with rabies. In 1913 it was almost eradicated but flared up again during and after the Great War to alarming proportions. It is at present declining.

Germany—The rabies situation was well in hand before the war, there being on the average 300 to 400 cases in animals annually. In 1915, it rose to 1018, after which there was an irregular increase to 2699 in 1924. Since that date the condition has improved and is greatly reduced in 1927. Human deaths were as

follows: 1924, 48; 1925, 20; 1926, 22. Persons bitten by rabid dogs for the same years were 2417, 1159, and 579 respectively.

Holland—Because of very rigid control measures there were no cases of rabies in Holland previous to the Great War. During that crisis there was some in the borders of the country but again none since.

Ireland—There has been no rabies for twenty years. All immigrant dogs are quarantined for six months.

Russia—No communication was received from this country, but it is well known that the rabies situation there is very serious, perhaps the worst of any country in the world. The disorganized state of the government, the prevailing ignorance, and the vast territory involved makes the situation well nigh hopeless.

Sweden—There has been no rabies since 1886 when there was one case in an imported animal. Strict regulations govern the importation of all members of the dog family.

Switzerland—Rabies is rare. Three hundred and twenty-nine Pasteur treatments were given in the quarter of a century just closed, and there was one human death.

Austria—Has been epidemic in recent years.

Italy—No very recent data, but has been quite common for a long time.

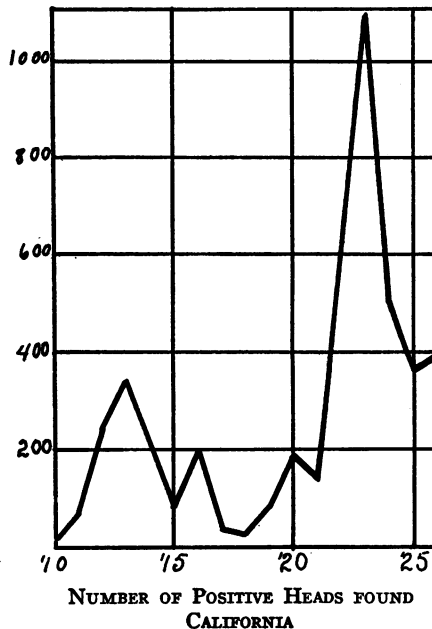
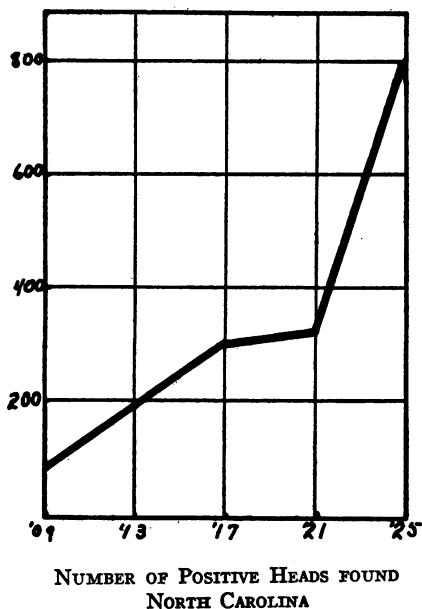
Balkan States—It has been an important problem here since the Great War and the years immediately preceding.

Spain and Portugal—Rabies very important public health problem.

Africa

Egypt—Rabies is very common among the countless homeless dogs. There is little effective control of the situation. The number of cases treated trebled from 1914 to 1924, but has decreased since. One thousand two hundred and fifty-one treatments were given in 1926 at Cairo alone.

Union of South Africa—fairly common in animals, and occasional cases in human beings.



Occidental French Africa—Rabies present but not prevalent.

Western Africa—Rabies is common.

Asia

Palestine—Rabies is very common.

Arabia—Common in the settled portions.

India—Data from the Pasteur Institute at Calcutta for the province of Bengal (population, 40,000,000): 1924 (7 months) 1995 patients treated, of whom 17 died; 1925, 5585 cases treated of whom 33 died. Total deaths for Bengal (human) 304 in 1925.

Japan—A very serious public health problem.

China—Rabies was known in the time of Confucius and has been a serious problem continuously to this day.

Siam—Very common.

Siberia—Very prevalent.

Tibet—Prevalent.

Oceanic Islands

Australia—Free of rabies and has always been so.

Hawaii—Free of rabies. All animals from foreign ports are quarantined for 128 days.

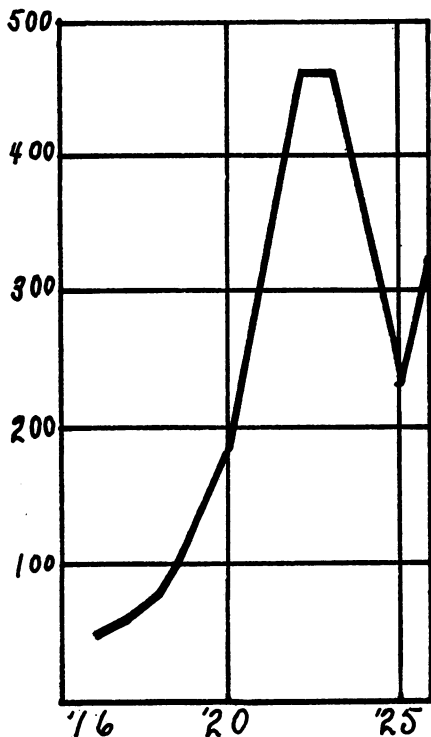
Philippines—Rabies is very common among the many dogs. Human deaths were 103 in 1925; 93 in 1926.

Dutch East Indies—Fairly common.

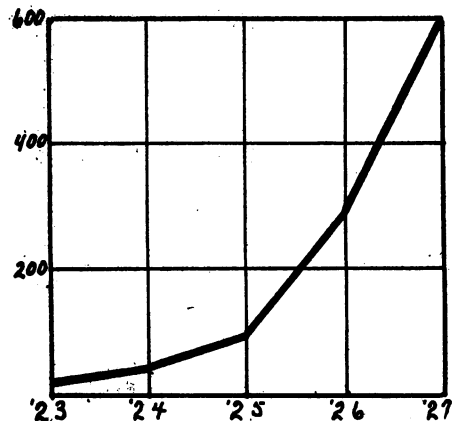
SUMMARY

1. Rabies is on the increase in the United States, or at least was so two years ago.

2. It increased in Europe during the Great War but has declined somewhat during the last three to five years there.



NUMBER OF POSITIVE HEADS FOUND
MASSACHUSETTS



NUMBER OF POSITIVE HEADS FOUND
INDIANA

3. It has been completely eradicated from certain countries, while in others it has apparently never existed.

4. In the main, rabies is more prevalent in those parts of the world where civilization is retarded, and poverty prevails.

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1. Sellers, T. F. Status of Rabies in the United States in 1921, *A. J. P. H.*, 13, 9:742 (Sept.), 1923.
2. Researches on Rabies (Abstract). *J. A. M. A.*, May 14, 1927, p. 1607.
3. Rabies (Notes). *A. J. P. H.*, 17, 4:397 (Apr.), 1927.
4. Kerr and Stimson. The Prevalence of Rabies in the United States, *J. A. M. A.*, Sept. 25, 1909, p. 989.

DISCUSSION

Dr. Strauss, Virginia—I can only second what Dr. Rice has said as to the extreme difficulty in getting reliable figures on the subject. A few years ago we checked up on the human deaths, and found that the only figures upon which we could place any dependence were numbers of positive dogs heads reported. We get that information not only from our own laboratories, but from the Washington laboratories who report all positive heads that they get from the northern part of Virginia. In that way, we are able to follow fairly well the progress of the disease through the state.

A few years ago, there was a very obvious increase along the entire southern border, which increase appeared to move gradually up through the state. By the time it reached the central section, it began to drop off, and this year we have a very decided decrease in the amount of rabies. Concerning our positive heads, for a fixed 8 months for 1925, 1926 and 1927, we find that in 1926 we had an increase of 57 per cent over 1925, while in 1927 we have a 30 per cent decrease under 1926. I believe the disease is really decreasing, temporarily at least, with us in Virginia.

I had the opportunity to watch a very definite epidemic in Richmond a year ago last spring. We had gone for a 2-year period in Richmond with no rabies at all, then in the suburbs there appeared one or two cases, which spread with great rapidity until it covered the entire city. There were three or four hundred dogs with the infection—fortunately no human cases. There was issued an ordinance at that time, compelling muzzling or confining of all dogs, and it seemed as though the dogs could read the ordinance, because there was an immediate decrease in the disease. What we think helped largely was the fact that the city put on extra dog-catchers, and almost completely rid the city of stray dogs. The stray dog is, of course, the real menace.

Dr. Howell, Springfield, Ill.—In 1923 in Illinois our rabies troubles began just as they did in Indiana. The first year, the trouble was confined to the southern part of the state, coming across the Wabash River. Gradually it spread northward. It has now reached the northern part of the state, and the city of Chicago is getting each month as many positive dog heads as it had for an entire year formerly. In the southern part of the state, the disease is falling off.

By plotting the cases geographically, and comparing your monthly returns with the normal rates, you can pretty nearly predict how long your epidemic is going to last. We have just passed through the time of year—August and September—when rabies should be at its lowest. However, Chicago has had a rather sharp increase during those months, indicating that next spring, perhaps, there will be a